

Contractor and service technician insulation tester and multimeter **ISO plus**

Areas of application:

- Inspection of new electrical installations
- Maintenance of electrical equipment and installations
- Troubleshooting and repair of electrical equipment
- Measurement of insulation quality
- Documentation and test results
- Detection of intermittent faults and monitoring of insulation resistance through data logging capabilities



General

Description:

The **ISO plus** has been designed specially for contractor and service technician applications. In addition to insulation testing up to 1 kV the **ISO plus** incorporates low resistance and continuity testing as well as leakage current measurement directly or with LEM current probes (CT's). Selectable scaling factors provide current ranges from 200 μ A to 200 A. Furthermore the **ISO plus** offers all the functionality of industry standard multimeters including TRMS voltage and frequency measurement in a true hand held design.

This unique combination satisfies universal applications in:

Insulation measurement up to 20G Ω with test voltages of 100V, 250V, 500V and 1000V.

Low-resistance measurement according to EN 61557-4 with a short-circuit current of >200mA, (50mA can be selected to extend battery life) for applications with non-fused earth conductor connections and equipotential bus bars.

Fast continuity testing with selectable buzzer threshold between 0.2 Ω and 50 Ω and a maximum response time of 100ms meeting all test standards.

Leakage Current measurement through an external current transformer with selectable transformer ratio from 1:1 up to 1:1000 and ranges from 200 μ A to 200A.

Voltage measurement with display of AC and DC values up to 600V with an 800V overrange feature.

With additional functions including ZERO (test lead null / relative), REC (Min, Max, Avg) and LIMIT (Alarm), the **ISO plus** provides a complete measurement solution in one compact handheld instrument.

Main features:

- Easy to use handheld design measuring V, Ω , M Ω , Hz, A (mA)
- Large dual display with bright EL backlight and bargraph
- Advanced safety features including live circuit protection without fuse damage, test lock out and auto discharge after test
- Insulation measurements up to 20 G Ω with 100, 250, 500 and 1000V test voltages and display of test current
- On screen display of Polarisation Index and Dielectric Absorption Ratio for insulation quality
- Auto ranging resistance measurement to 200k Ω with a selectable 200mA or 50mA low resistance testlead compensation
- Continuity test with adjustable thresholds, fast-responding buzzer and visual indicator (buzzer can also be de-activated)
- True RMS voltage measurement with display of AC, DC and AC+DC values and mV resolution
- Leakage current measurement directly or with LEM current probes in current ranges from 200 μ A to 200A
- LIMIT (adjustable alarm) to quickly and reliably identify fault conditions
- REC function for MIN, MAX, AVG values

Additional features ISO plus M

- Simple storage of up to 350 insulation test results to internal memory with on screen viewing or PC download
- Internal datalogging of current, voltage and insulation (upto 1000 rdgs) for trend and intermittent fault analysis
- WinLog PC software and interface included for data analysis and reporting (also compatible with HEME power clamps)

Technical Specifications

General

Display:	1999 digit dual LCD with special symbols, digit height 17 mm, 30 segment analogue bar with over/ underflow and special display symbols, EL backlight
Temperature ranges:	
Working temp.:	-10° C ... +50° C (+14° F...+122° F)
Operating temp.:	0° C ... +35° C (+32° F...+95° F)
Storage temp.:	-20° C ... +60° C (-4° F...+140° F)
Reference temp.:	+23° C ± 2° C (+73° F ± 4° F)
Temperature coefficient:	0.1 x operating error/K
Intrinsic Error refers to the reference temperature range	
Climatic class:	B2 (IEC 654-1), -5° C..+45°C, 5%...85% RH, no dew
Maximum operating altitude:	2000m
Protective type:	IP40 according to EN 60529
Safety:	<input checked="" type="checkbox"/> Protection by reinforced insulation □ 600V CATIII pollution degree 2
Test voltage:	5550 V AC, measuring circuit to enclosure
Emission:	IEC/EN 61326-1:1997 +A1:1998 class B
Immunity:	EN 61000-4-2:1995 - B, EN 61000-4-3: 1996 EN 61000-4-4:1995 - B, EN 61000-4-5: 1995 EN 61000-4-6:1996 - B, EN 61000-4-8: 1993
Intrinsic error:	Refers to the reference temperature range and is guaranteed for 2 years.
Operating error:	Refers to the operating temperature range and is guaranteed for 2 years.
Quality system:	Developed, designed and manufactured according to DIN ISO 9001
External voltage:	Measurement inhibited for external voltage $U_x > 10\% \text{ of } U_N$ for $M\Omega$ and $> 3\text{V}$ for R
Max. overload:	800 Veff RMS or RMS x frequency < $5 \times 10^4 \text{ V/Hz}$
Auxiliary power:	4 x 1.5 V mignon cells alkali-manganese (IEC LR6)
Battery life span:	Typical (no backlight) > 2000 measurements in $M\Omega$. 100 hours continuous operation for resistance, voltage measurements and mA measurements.
Fuse	630mA quick acting 600V 10kA/32x6.3mm
Dimensions:	220 x 98 x 52 mm (12 x 3.75 x 2 inches)
Weight:	0.8 kg / 1.8 lbs (including batteries)
Warranty:	2 years
Calibration interval:	2 years recommended

MΩ - R_{ISO} Insulation Resistance

Method:	Voltage/current measurement as per EN 61557-2
Nominal test voltage:	$U_N = 100\text{V}, 250\text{V}, 500\text{V}, 1000\text{V DC}$
Open circuit voltage:	$U_0 < 1.1 \times U_N$
Nominal current:	$I_N \geq 1\text{mA DC at } U_N$ $I_N \geq 2.5\text{mA DC at } 100\text{k}\Omega \text{ at } 250\text{V}$
Short circuit current:	<10mA DC

Measuring range	Resolution	Operating error
1.8kΩ...2 GΩ	0.1kΩ...1MΩ	±(2% of rdg+4D)
2GΩ...20GΩ	10MΩ	±(4% of rdg+4D)

Display of the measuring current I_{ISO} .

Calculation of Polarisation Index I_P and Dielectric Absorption Ratio:

R_{ab} after pre-defined time interval:

$I_P = R_{ISO}(10\text{min}) / R_{ISO}(1\text{min})$

$R_{ab} = R_{ISO}(1\text{min}) / R_{ISO}(30\text{sec})$

In case of external voltage of >10% of U_N the measurement is not started (safety interlock).

R - Low Resistance Measurement

Method: Voltage/current measurement as per

EN 61557-4

Open circuit voltage: $U_0 \geq 4\text{V}$

Short circuit current: $I_s \geq 200\text{mA DC up to } 2\Omega \text{ as per}$

EN61557 (excludes $I_k : 50\text{mA}$)

Measuring range	Resolution	Intrinsic error
0.2Ω...20Ω	0.01Ω	±(1% of rdg+3D)*
20Ω...200Ω	0.1Ω	±(1% of rdg+2D)
200Ω...2kΩ	1Ω	
2kΩ...20kΩ	10Ω	
20kΩ...200kΩ	100Ω	

* (1% of rdg +6D) for $I_k = 50\text{mA}$

In case of external voltages of >3V the measurement with 200mA/50mA is not started.

SMR Serial mode rejection approx. 60dB at 50 and 60Hz

CMR Common mode rejection approx. 80dB at 50 and 60Hz

Continuity check:

Buzzer activated for external resistance within 100ms

Buzzer level adjustable with LIMIT function from 0.2...50Ω.

Test lead compensation (ZERO) from 0.01...5Ω.

V - TRMS Voltage Measurement

DC: Input resistance: $1M\Omega / 100\text{pF}$

Measuring range	Resolution	Intrinsic error VDC
2V	1mV	±(2% of rdg+5D)
20V	10mV	±(2% of rdg+2D)
200V	100mV	
600V	1V	

SMR Serial mode rejection approx. 60dB at 50 and 60Hz for DC (influence of AC signals to DCV-display)

CMR Common mode rejection approx. 80dB at 50 and 60Hz

Auto range set up time: 1.5s

Max. voltage frequency product: $5 \times 10^4 \text{ V/Hz}$

Over-range up to 1000V with flashing \uparrow symbol

AC: Specifications valid for AC RMS >5% of range

Measuring range	Resolution	Intrinsic error VAC 15Hz – 1kHz
2V	1mV	±(2% of rdg+5D)
20V	10mV	±(2% of rdg+3D)
200V	100mV	
600V	1V	

Displayed values for voltage measurements: AC, DC and AC+DC+F. Crest factor 3 for values at the end of the ranges

V_{peak} : 1200V_P

Over-range up to 800V with flashing \uparrow symbol.

Frequency range: DC, 15Hz...1kHz at ACRMS

F - Frequency Measurement (at V>0,5V)

Measuring range	Resolution	Intrinsic error
200Hz	0.1Hz	±(0.2% of rdg +3D)
1kHz	1Hz	

Method: Evaluation of zero crossings in signal

Temperature coefficient < 50ppm, sensitivity > 10% of voltage and current range end value

mA – RMS (Leakage) Current Measurement

Direct current measurement within the following ranges:

Measuring range	Resolution	Intrinsic error
20...199.9 μ A	100 nA	±(3% of rdg+5digit)
0.2...1,999 mA	1 μ A	±(3% of rdg+5digit)
2...19.99 mA	10 μ A	±(3% of rdg+5digit)
20...199.9 mA	100 μ A	±(3% of rdg+5digit)

Specifications valid for AC RMS >5% of range

Displayed values: AC

Frequency range: 15Hz...1kHz

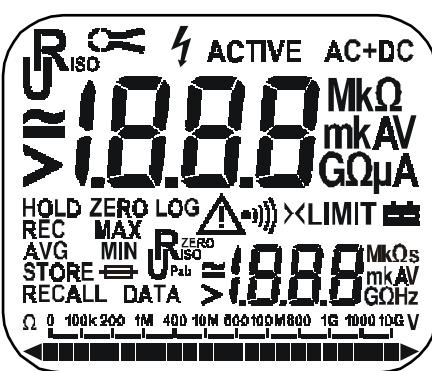
Max. overload: 630mA (Fuse)

Auto range setting time: 2s

Current compensation (ZERO) possible.

Direct current measurement (1:1) or measurement through an external current transformer with **current or voltage output** (integrated load) and transformer ratios of 1:1, 1:10, 1:100, 1:500 or 1:1000.

Clamp symbol in LCD at 1:10, 1:100, 1:500 and 1:1000.



Scope of Delivery, Accessories, Service

Instrument	Order-No.
ISO <i>plus</i> incl. 2 safety measuring leads with test prods, 1 crocodile clip, 4 batteries 1.5V, operating instructions, 1 pouch with belt loop	SI1310Z
ISO <i>plus M</i> incl. 2 safety measuring leads with test prods, 1 crocodile clip, 4 batteries 1.5V, operating instructions, 1 pouch with belt loop. WinLog software including custom RS232 interface cable	SI1311Z

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